

PRELIMINARY NOTE ON NEW SPECIES OF SPONGES  
FROM THE QUEBEC GROUP AT LITTLE MÉTIS.

By SIR J. WILLIAM DAWSON, LL.D., F.R.S.

Little Métis Bay presents a good section of rocks of the Quebec Group, including sandstones, slates and conglomerates similar to those which characterise this series of beds along the south shore of the St. Lawrence. These beds have afforded a species of *Retiolites*, allied to or identical with *R. ensiformis* of Hall<sup>1</sup>, worm-burrows of various forms, including a spiral form similar to *Arenicolites spiralis*, and radiating markings of the kind elsewhere known as *Astropolithon*. A small species of *Obolella* also occurs, resembling *O. Ida* of Billings. In the conglomerates are limestone boulders, holding fragments of Trilobites of the genus *Solenopleura* and other fossils; but these seem to be of Middle Cambrian age, or considerably older than the beds in which they occur.

*Limnæonina*

70 in 100

5000

70  
50  
3500

<sup>1</sup> Identified by Prof. Lapworth.

There can be no doubt, from the stratigraphical position

of these beds, that they belong to the Quebec Group of Sir W. E. Logan. This is, however, now known to include, on the Lower St. Lawrence, beds ranging from the Calciferous to the Trenton, and the beds are so much plicated that it is often difficult to unravel their complexities of arrangement.<sup>1</sup> At Métis, the evidence of the pebbles in the conglomerates indicates that they are newer than the Middle Cambrian, and the few fossils found in the sandstones and shales would tend to place them at or near the base of the Lévis division, or approximately on the horizon of the Chazy, or equivalent to the English Arenig. Lapworth, in his paper on "Canadian Graptolites," suggests that the sandstones holding Retiolites are older than this; but hitherto we have not found at Métis the characteristic Graptolites of the older or Matane series, which occurs further east, and is probably of Calciferous or Tremadoc age.

3301

.2.

The locality of this discovery is the beach at the foot of the cliff below the Wesleyan church, where a considerable thickness of black shales appears well exposed. The section at this place is as follows, in descending order:—

1. A thick bed of hard sandstone or quartzite and conglomerate, forming the cliff immediately in front of the church, and shewing in some of the beds radiating markings (*Astropolithon*).

2. Black and dark gray shales, with a few calcareous bands—thickness about 100 feet. The black shales of this band hold sponges and layers of sponge spicules, with fucoids (*Buthotrephis*, of a new species,) and valves of a small *Obolella*. All of these fossils are usually in a pyritised state.

<sup>1</sup> Logan, Geology of Canada, 1863; Selwyn, Report Geol. Survey, 1877-78; Ells, *Ibid*, 1880-82; Lapworth, Canadian Graptolites, Trans. R. S. C., 1886.

3. Flaggy sandstone and shale, about 20 feet.

4. Hard sandstone with quartz veins, 3 to 5 feet.

5. Hard gray shales and calcareous and dolomitic bands, with some layers of sandstone—800 feet or more.

6. Apparently underlying these, and occupying a great extent of the shore, are black, gray and red shales and thick beds of gray sandstone, the latter appearing at Mt. Misery and Lighthouse Point, and holding the Graptolites above referred to. These beds must be of great thickness in the aggregate, but they are possibly repeated in part by faults and contortions.

The sponges contained in Band 2 above, are apparently confined to a small thickness of the shale, but in this are quite abundant. They are perfectly flattened, and their spicules are replaced by pyrite; but in some cases they retain the outline of their form, and have their root spicules attached. The spicules were, no doubt, originally siliceous, but they have shared the chemical change experienced by other fossils in this bed, whereby they have lost their siliceous matter and have had pyrite deposited in its place. In some cases, also, the pyritised spicules have been frosted with minute crystals of the same substance, greatly enlarging their size and giving them a mossy appearance. This pyritization of spicules, once probably silicious, is not uncommon in palæozoic rocks, and it arises from the soluble condition of the silica in sponges, and its association with organic matter, which, in some modern sponges, as in *Hyalonema*, enters into the composition of the spicule itself. These spicules, therefore, suffer the same change with the calcareous shells associated with them.

Many of the sponges in these beds have been entire when entombed. Others are decayed and partially broken up, and there are some surfaces covered with confused patches of loose spicules arising from the disintegration of many specimens.

Some remarks are perhaps necessary here respecting the appearance of sponges in different states of preservation. Of course the original textures of sponges are different, and

those which have consolidated spicules or firm external cortex, are those most likely to retain their original forms. Even the looser kinds of sponges, however, may under certain circumstances preserve their rotundity of form, in which case they will usually show external markings, but not so well internal structure, unless when sliced. On the other hand, when completely flattened, which is usually the case in shaly beds, only an outline of the form remains, and sometimes not even this, while the forms and in part the arrangement of the spicules are usually apparent. Farther, the hollow and thin-walled species are more liable to be completely flattened, though in some cases, as in the Devonian *Dictyospongiæ*, they may retain their form. It was this property, and the membranous appearance of the outer coat, that for a long time sustained the belief that these were plants rather than sponges.

In the case of the sponges procured in the shales at Little Metis, perfect flattening has occurred, and in many cases the spicules have been separated, and appear as mere spicular patches or layers. In other instances, however, they remain approximately in their natural position, and even the general outline of the form can be observed. The collections include several species of sponges, Hexactinellid and Monactinellid; but, so far as observed, one of them is more abundant and better preserved than the others. The following may serve as a preliminary rough description of the species collected,—which will be more fully described and commented on by Dr. J. George Hinde, F.G.S., the author of the British Museum Catalogue of Fossil Sponges. See paper appended.

~~Spongia~~

~~Stylo~~ Sarcodema  
~~Spongia~~ flabellata

9 Sarcia

4. Small ovoid masses of stout biacerate spicules, diverging from the centre and sometimes in fan-shaped tufts, seem to indicate a species of the genus *Lasiocladia* of ~~Hinde~~. The specimens shew indications of an external membrane, and they had somewhat strong root spicules, much larger than those of the body.

It seems uncertain whether the fan-shaped bundles are really such a spicules radiating from small nuclei

It Hinde 189  
Remarks - 9

On some of the slabs from Métils are small oval compressed patches, apparently consisting of small fusiform acerate spicules, sometimes parallel, at other times crossing each other irregularly. They do not stand out definitely as in the case of the hexactinellid sponge spicules, but appear to be embedded in some membrane. In two instances, anchoring spicules, like those of *Protospongia*, project from the base of the mass. I do not know of any monactinellid sponge furnished, as these appear to have been, with long anchoring spicules. Sir J. W. Dawson has suggested a resemblance to *Lasiocladia*, but they do not belong to this genus.

In some cases the form appears merely as a sheet of simple spicules compressed scattered among gummy matters

Hinde paper 2 to callus  
Sarcodema  
Sarcodema  
Sarcodema

Woods paper, Acanthodictya

<sup>Genus</sup>  
9 & *Amucosporia* *lupida*.

Appears as flattened bands  
of long spines with narrow  
bands of paper of defecum  
spines on the sides. Usually  
up usually cylindrical and  
rolled. Under microscope  
shows forams of spines  
sometimes slightly twisted spiral  
and with delicate radial  
spines and appearing a  
few creeping flat spines  
The margins thickly beset  
with short defecum spines  
at right angles to the long  
of the spines.

This sometimes associated  
with *Rubropurpura tetanema* and  
*P. polygama* as I suggest the  
idea that it may have  
grown parasitically on these  
but this may be very well  
debatable. ~~As the other bands~~  
~~the thin twisted spines to be~~  
~~mixed in the deposit may have been from~~  
~~of this species~~

8

*Hyalostelia Metissica*, Dawson. (No. 2 of previous paper.)  
This species is based on detached cruciform and anchoring spicules, the latter somewhat more robust than those placed as *C. Quebecensis*. In the present fragmentary condition of these forms it is impossible to give a satisfactory description, and the species must be regarded as provisional until better specimens are discovered.  
Sponges of uncertain character

All specimens flattened  
Shape of cup  
But spicules numerous long  
Dense by the sponges  
Spicules and large cup  
Spicules with slender rays  
Maybe allied to *Gastropora*  
but does not show central  
ray arrangement of body spicules  
Small not spicules  
Froster names

Mason College

Birmingham

July 2/88.

Dear Sir William

I have examined  
the two fragments of Graptolites  
you have forwarded to me from  
the Quebec Group at Ineter. So  
far as I am able to decide from  
their imperfect state of preservation  
they appear to me to belong to the genus  
Reticularia of Hall (= Trigonograptus  
of H. A. Nicholson), and are identical  
with, or closely allied to Hall's  
Reticularia cusiformis.

I am already quite fa-  
miliar with this form from the  
Sandstone & gritty groups below the  
Lens beds. The species has long been  
recognized by myself from  
C. Chalthe & many other spots  
along the south side of the S<sup>th</sup>



*Obolella Ida?* Billings.

I refer the specimens of Brachiopods found to this species, which belongs to the Lévis division of the Quebec Group. The valves are mostly pyritized, but sometimes flattened and then represented by a mere carbonaceous film. Mr. Whiteaves, to whom I have shewn these shells, agrees with me on their probable reference to one of Mr. Billings' smaller species from the Quebec Group.

*Cystites?*

A small-jointed stem one centimetre in length, with an elongated, flattened, oval mass at one end, in which, however, no distinct plates can be discovered.

*Buthotrephis pergracilis.* S. N.

Stems very long and flexuous, about one millimetre in diameter, and obscurely striate longitudinally; sending off at their extremities short alternate or opposite branches. Allied to *B. gracilis*, Hall, of the Siluro-Cambrian, but much more elongated and slender. These plants are replaced by pyrite.

13 *Brachma* kinds of Knot Specimens

Some patches of fine slender specimens  
- show a lachrymatory or sheaf-like  
arrangement and may have  
been cut  
Others are by lay and nearly  
parallel and extremely  
slender

Others are coarse and more  
more rough parallel  
a slightly divergent

They which are units of ~~the~~ short  
specimens by spiral markings. When  
carefully examined they are seen  
to consist of several specimens twisted  
spiral like a rope, it still more  
~~the~~ coarse form is a complex  
spiral made up of several  
spiral strands. Under the microscope  
this is very pretty form. All are  
close and apparently not connected  
with my specimens

This is a small *Gastropoda*

11. *Crossopogon animalis*

When first paper this species  
is found in small with scattered  
unusual specimens in the middle  
and very long defensive spines  
extending, it shows no distinct  
roots and could be seen  
to have been <sup>part</sup> of *Eumecurus*  
since that its <sup>part</sup> spines are few  
and delicate it then has a  
map of *Pute* in the center  
a cavity of form an outline  
that there was much organic  
matter present.

It is allied to *Gastropogon*  
but differs in the want of  
distinct *truncus* spines and  
in its simple rather *truncus*  
spines and in its long *truncus*  
spines. Specimens of this species  
are small *truncus* observed  
with *truncus* *truncus*.

Crinoids

12, ~~Halysites~~ ~~sp~~ ~~like~~ ~~def~~ ~~sp~~

8. Oval masses of small simple spicules, imbedded in patches of pyrite and without any definite arrangement of root spicules, may either indicate the presence of a halichondroid sponge, or of patches of spicules imbedded in coprolitic matter. The former is, perhaps, more likely to be the correct explanation.

13 ~~Remains of oval sponges~~  
~~of with large oracles~~  
~~and fine crinoid spicules~~  
~~see specimen in museum~~  
see ante

While the above paper was in the press, Dr. Selwyn was so kind as to send to me for inspection, through Mr. Ami, of the Geological Survey, some slabs of gray and dark coloured shale from the Quebec group rocks of the Chaudière River, in which spicules of sponges had been detected some years ago, by Mr. T. C. Weston and Mr. Willmott of the Survey, but which have not been published. The specimens show two forms of cruciform spicules, one with very slender rays and as much as a centimetre in measurement from point to point, the other stouter and measuring about five millimetres in extent, and therefore more nearly resembling those of *Protospongia tetraema*. There are also long

slender root spicules scattered on one of the slabs. On another specimen are large and strong forking spicules, the principal ray being about 1.5 centimetre in length, with a bulb or expansion at base, giving off two or more shorter and stout rays. They are quite different from any of the forms found at Metis.

These specimens are from beds referred to the Lewis or Silley formation, and are therefore approximately of the same age with those at Metis. They indicate the wide distribution of Hexactinellid siliceous sponges in rocks of this period, and hold out the prospect of the discovery of additional species.

Mr. Ami also showed me a new sponge recently discovered by him in the Utica Shale at Ottawa. It consists of radiating groups of long slender simple spicules in a pyritized state. He hopes to make further collections from the same bed before describing these interesting forms, which resemble the spicules of the Pleistocene *Tethya Loganii*, so common in the Leda clay of the St. Lawrence, but which may possibly be root spicules of a Hexactinellid sponge, as there are obscure cruciform spicules on the same slab.

This fact was not distinctly noticed till the specimens were carefully examined, and it invites to further search in the locality, in hope of discovering new forms or more perfect examples of those represented in the present collection only by fragments.

Old Mrs.  
Waters  
Spring